



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5 CHICAGO REGIONAL LABORATORY  
536 SOUTH CLARK STREET  
CHICAGO, ILLINOIS 60605



**Date:** 4/11/2014

**Subject:** Review of Region 5 Data for SE Chicago Petcoke

**From:** Troy Strock  
Region 5 Chicago Regional Laboratory

**To:** Air Division, US EPA Region 5  
77 West Jackson Boulevard  
Chicago, IL 60605

The data being transmitted under this cover memo successfully passed CRL's internal data review procedures as documented in our current Quality Management Plan (QMP) and appropriate Standard Operating Procedures (SOPs). Please be aware that CRL does not perform data validation which is based on your data quality objectives. This function must be performed independently of the laboratory generating the data.

Results in this report represent only the samples analyzed.

Please have the U.S. EPA Project Manager/Officer call the CRL Sample Coordinator at (312) 353-0375 for any comments or questions.

**Attached are Results for: SE Chicago Petcoke**

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Data Management Coordinator and Date Received

Date Transmitted: \_\_\_\_/\_\_\_\_/\_\_\_\_

**Analyses included in this report:**

SVOA PAHs in solids by press. fluid extr. (SIM)



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**Chicago Regional Laboratory**

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Air Division, US EPA Region 5  
77 West Jackson Boulevard  
Chicago IL, 60605

Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

Reported:  
Apr-11-14 10:21

## **ANALYSIS CASE NARRATIVE**

Analyst Phone number: 312.353.8362

### **General Information**

Seven solid samples were received on 3/04/2014 for extraction and analysis by Chicago Regional Laboratory (CRL) Standard Operating Procedure (SOP) MS026 rev. 8 (based on SW-846 Method 8270D). These samples were analyzed for polycyclic aromatic hydrocarbons (PAHs), including the target analytes listed in Table A.3.7 in the appendix of the SOP, along with perylene, an additional PAH of interest to the data user. All holding times were met for sample preparation and analysis.

The mass spectrometer was operated in selected ion monitoring (SIM) mode, which is more sensitive than full scan, but mass spectra acquired in SIM mode are limited to a couple of ions per analyte, resulting in poorer confirmation of peak identification by mass spectrum in unknown samples, as mass spectra acquired in SIM cannot be searched against a mass spectral library for confirmation of target analyte identification or for identification of non-target interferences.

### **Sample Analysis and Results**

PAHs were observed and quantified in every field sample for this project. Refer to the main body of the report for details. Extracts of field samples were each analyzed at 3 dilutions, and results in the field samples in the instrument calibration range were consistent after accounting for dilution. The empty sample jar included with the field samples (designated laboratory sample ID 1403002-08 and field sample ID 'BLANK' in the report) was not tested.

### **Quality Controls**

#### **Initial Calibration:**

Most of the target analytes were contained in the primary and second source standards used for initial calibration of the instrument and initial calibration verification, respectively. However, no certified second source standard was analyzed or evaluated for 1-methylnaphthalene, benzo(e)pyrene, or perylene. Response factors for these analytes were similar to structural isomers that met criteria for initial calibration verification.

#### **Method Blank Contamination:**



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A few target analytes were measured in one or both method blanks at concentrations below the reporting limit (RL) but at a concentration >20% of those in the reporting limit verification QC samples. The data review SOP GEN010 Rev. 9 recommends qualifying results as potentially high bias ("K") if they are within a factor of 5 of the method blank result when the method blank concentration is below the RL. As a result, acenaphthylene, anthracene, benzo(a)anthracene, and chrysene are qualified as potentially high bias ("K") in B404035-MRL1, and phenanthrene is qualified as potentially high bias in B404035-MRL2.

#### **Surrogates Spike Recovery:**

The non-ionizable surrogates listed in section 8.2 of the SOP (nitrobenzene-d5, 2-fluorobiphenyl, terphenyl-d14) were used for evaluation of successful preparation and analysis of each field sample and QC sample listed in this report. The solvent extract of sample 1403002-03 was only analyzed at 100-fold and 1000-fold dilution because higher levels of target PAHs were measured in this sample. At these levels of dilution, the surrogates were diluted to below the calibration range, so they are not reported in this sample, and no data are qualified due to lack of surrogate recovery. Of the remaining samples, recovery of nitrobenzene-d5 was low in samples 1403002-01 and 1403002-06, and recovery of this surrogate was slightly high in 1403002-02, -04, and -07. The data review SOP (GEN010 Rev 9) recommends qualifying associated target analyte data only if two of the three surrogates do not meet acceptance criteria, so no target analyte results are qualified.

#### **Target Compounds Spike Recovery:**

Recovery of 1-methylnaphthalene is evaluated against control limits provided in the SOP for 2-methylnaphthalene, and recovery of perylene and benzo(e)pyrene is evaluated against control limits for benzo(a)pyrene. Once sufficient data are acquired, historical spike recovery statistics for these analytes will be used to generate more appropriate recovery criteria. An RL study has been completed for benzo(e)pyrene and 1-methylnaphthalene and is summarized in the SOP in Attachment 3 table A.3.7. A similar RL study has not been completed for perylene, so the concentration of this analyte is qualified as estimated ("J") in all field samples until it is included in the SOP.

Sample 1403001-01 was selected for matrix spiking, and the matrix spike and matrix spike duplicate data are provided in the report for work order 1403001. Please refer to that analysis report for more information.

#### **RL Verification:**

For this analysis, RL verification QC samples were prepared at two (nominal) spike levels: 0.67 ug/kg (B404035-MRL1) and 3.3 ug/kg (B404035-MRL2), and the same acceptance criteria are used to evaluate these QC samples as used for the blank spikes and matrix spikes. All target analytes met acceptance criteria for RL



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verification, although some values are qualified as potentially high bias because results are less than five times the corresponding analyte concentrations in the method blank(s). Values are only reported for the individual PAHs in the RL verification QC sample corresponding to that analyte's RL (listed in Table A.3.7 of the SOP).

All other quality controls not mentioned here meet the SOP criteria.

NOTE: All hard copy data for this work order and all supporting information is archived in the folder for work order 1403001.

Signature \_\_\_\_\_, Date \_\_\_\_\_



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**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
N-1	1403002-01	Soil	Mar-04-14 08:38	Mar-04-14 15:15
N-2	1403002-02	Soil	Mar-04-14 09:10	Mar-04-14 15:15
N-3	1403002-03	Soil	Mar-04-14 10:30	Mar-04-14 15:15
N-4	1403002-04	Soil	Mar-04-14 09:50	Mar-04-14 15:15
N-5	1403002-05	Soil	Mar-04-14 12:50	Mar-04-14 15:15
N-6	1403002-06	Soil	Mar-04-14 13:20	Mar-04-14 15:15
N-2 Duplicate	1403002-07	Soil	Mar-04-14 09:10	Mar-04-14 15:15



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**Semivolatiles by GC/MS, EPA 8270D (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

N-1 (1403002-01) Soil Sampled: Mar-04-14 08:38 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	609			75.7	ug/kg dry	10	B404035	Mar-12-14	Apr-01-14
2-Methylnaphthalene	1450			75.7	"	100	"	"	Apr-01-14
1-Methylnaphthalene	660			75.7	"	10	"	"	Apr-01-14
Acenaphthylene	U			15.4	"	"	"	"	"
Acenaphthene	U			75.7	"	"	"	"	"
Fluorene	U			75.7	"	"	"	"	"
Phenanthrene	586			75.7	"	"	"	"	"
Anthracene	273			15.4	"	"	"	"	"
Fluoranthene	142			75.7	"	"	"	"	"
Pyrene	552			75.7	"	"	"	"	"
Benzo (a) anthracene	726			15.4	"	"	"	"	"
Chrysene	692			15.4	"	"	"	"	"
Benzo(b)fluoranthene	318			15.4	"	"	"	"	"
Benzo(k)fluoranthene	89.8			15.4	"	"	"	"	"
Benzo (e) pyrene	615			15.4	"	"	"	"	"
Benzo(a)pyrene	896			15.4	"	100	"	"	Apr-01-14
Perylene	64.5	J		15.4	"	10	"	"	Apr-01-14
Indeno(1,2,3-cd)pyrene	249			15.4	"	"	"	"	"
Dibenz(a,h)anthracene	281			15.4	"	"	"	"	"
Benzo(g,h,i)perylene	680			15.4	"	"	"	"	"

	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Nitrobenzene-d5	9.20	48.1%	50-94.9	"	"	"
Surrogate: 2-Fluorobiphenyl	16.8	88.0%	48.1-108	"	"	"
Surrogate: Terphenyl-d14	17.6	92.1%	59.4-127	"	"	"

N-2 (1403002-02) Soil Sampled: Mar-04-14 09:10 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	754			75.8	ug/kg dry	10	B404035	Mar-12-14	Apr-01-14
2-Methylnaphthalene	2220			75.8	"	100	"	"	Apr-01-14
1-Methylnaphthalene	936			75.8	"	"	"	"	"



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**Semivolatiles by GC/MS, EPA 8270D (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

N-2 (1403002-02) Soil Sampled: Mar-04-14 09:10 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Acenaphthylene	25.4			15.4	ug/kg dry	10	B404035	Mar-12-14	Apr-01-14
Acenaphthene	110			75.8	"	"	"	"	"
Fluorene	250			75.8	"	"	"	"	"
Phenanthrene	1560			758	"	100	"	"	Apr-01-14
Anthracene	950			154	"	"	"	"	"
Fluoranthene	479			75.8	"	10	"	"	Apr-01-14
Pyrene	2300			758	"	100	"	"	Apr-01-14
Benzo (a) anthracene	3850			154	"	"	"	"	"
Chrysene	4350			154	"	"	"	"	"
Benzo(b)fluoranthene	2090			154	"	"	"	"	"
Benzo(k)fluoranthene	444			15.4	"	10	"	"	Apr-01-14
Benzo (e) pyrene	3910			154	"	100	"	"	Apr-01-14
Benzo(a)pyrene	3960			154	"	"	"	"	"
Perylene	277	J		15.4	"	10	"	"	Apr-01-14
Indeno(1,2,3-cd)pyrene	2830			154	"	100	"	"	Apr-01-14
Dibenz(a,h)anthracene	2850			154	"	"	"	"	"
Benzo(g,h,i)perylene	5240			154	"	"	"	"	"
	Result			%REC		%REC Limits	Batch	Prepared	Analyzed
Surrogate: Nitrobenzene-d5	20.4			107%		50-94.9	"	"	Apr-01-14
Surrogate: 2-Fluorobiphenyl	18.2			95.1%		48.1-108	"	"	"
Surrogate: Terphenyl-d14	16.2			84.8%		59.4-127	"	"	"

N-3 (1403002-03) Soil Sampled: Mar-04-14 10:30 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	1530			764	ug/kg dry	100	B404035	Mar-12-14	Apr-01-14
2-Methylnaphthalene	4110			764	"	"	"	"	"
1-Methylnaphthalene	1350			764	"	"	"	"	"
Acenaphthylene	U			155	"	"	"	"	"
Acenaphthene	U			764	"	"	"	"	"
Fluorene	U			764	"	"	"	"	"



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**Semivolatiles by GC/MS, EPA 8270D (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

N-3 (1403002-03) Soil Sampled: Mar-04-14 10:30 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Phenanthrene	4220			764	ug/kg dry	100	B404035	Mar-12-14	Apr-01-14
Anthracene	2110			155	"	"	"	"	"
Fluoranthene	2100			764	"	"	"	"	"
Pyrene	17400			7640	"	1000	"	"	Mar-29-14
Benzo (a) anthracene	14100			1550	"	"	"	"	"
Chrysene	19500			1550	"	"	"	"	"
Benzo(b)fluoranthene	10300			1550	"	"	"	"	"
Benzo(k)fluoranthene	2730			155	"	100	"	"	Apr-01-14
Benzo (e) pyrene	46900			1550	"	1000	"	"	Mar-29-14
Benzo(a)pyrene	30600			1550	"	"	"	"	"
Perylene	3220	J		155	"	100	"	"	Apr-01-14
Indeno(1,2,3-cd)pyrene	7210			155	"	"	"	"	"
Dibenz(a,h)anthracene	8540			1550	"	1000	"	"	Mar-29-14
Benzo(g,h,i)perylene	40200			1550	"	"	"	"	"

N-4 (1403002-04) Soil Sampled: Mar-04-14 09:50 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	711			78.4	ug/kg dry	10	B404035	Mar-12-14	Apr-02-14
2-Methylnaphthalene	2360			784	"	100	"	"	Apr-02-14
1-Methylnaphthalene	966			784	"	"	"	"	"
Acenaphthylene	19.1			15.9	"	10	"	"	Apr-02-14
Acenaphthene	115			78.4	"	"	"	"	"
Fluorene	291			78.4	"	"	"	"	"
Phenanthrene	2300			784	"	100	"	"	Apr-02-14
Anthracene	1130			159	"	"	"	"	"
Fluoranthene	764			78.4	"	10	"	"	Apr-02-14
Pyrene	4940			784	"	100	"	"	Apr-02-14
Benzo (a) anthracene	7420			159	"	"	"	"	"
Chrysene	9910			1590	"	1000	"	"	Mar-29-14
Benzo(b)fluoranthene	4120			159	"	100	"	"	Apr-02-14
Benzo(k)fluoranthene	772			15.9	"	10	"	"	Apr-02-14
Benzo (e) pyrene	10500			1590	"	1000	"	"	Mar-29-14



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**Semivolatiles by GC/MS, EPA 8270D (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

N-4 (1403002-04) Soil Sampled: Mar-04-14 09:50 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo(a)pyrene	8640			1590	ug/kg dry	1000	B404035	Mar-12-14	Mar-29-14
Perylene	630	J		15.9	"	10	"	"	Apr-02-14
Indeno(1,2,3-cd)pyrene	2370			159	"	100	"	"	Apr-02-14
Dibenz(a,h)anthracene	3410			159	"	"	"	"	"
Benzo(g,h,i)perylene	8940			1590	"	1000	"	"	Mar-29-14
	Result			%REC		%REC Limits	Batch	Prepared	Analyzed
Surrogate: Nitrobenzene-d5	21.0			106%		50-94.9	"	"	Apr-02-14
Surrogate: 2-Fluorobiphenyl	18.8			95.1%		48.1-108	"	"	"
Surrogate: Terphenyl-d14	18.3			92.4%		59.4-127	"	"	"

N-5 (1403002-05) Soil Sampled: Mar-04-14 12:50 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	433			70.6	ug/kg dry	10	B404035	Mar-12-14	Apr-02-14
2-Methylnaphthalene	1190			706	"	100	"	"	Apr-02-14
1-Methylnaphthalene	457			70.6	"	10	"	"	Apr-02-14
Acenaphthylene	U			14.3	"	"	"	"	"
Acenaphthene	U			70.6	"	"	"	"	"
Fluorene	133			70.6	"	"	"	"	"
Phenanthrene	830			706	"	100	"	"	Apr-02-14
Anthracene	413			14.3	"	10	"	"	Apr-02-14
Fluoranthene	366			70.6	"	"	"	"	"
Pyrene	1430			706	"	100	"	"	Apr-02-14
Benzo (a) anthracene	1890			143	"	"	"	"	"
Chrysene	2120			143	"	"	"	"	"
Benzo(b)fluoranthene	1070			143	"	"	"	"	"
Benzo(k)fluoranthene	236			14.3	"	10	"	"	Apr-02-14
Benzo (e) pyrene	2220			143	"	100	"	"	Apr-02-14
Benzo(a)pyrene	2370			143	"	"	"	"	"
Perylene	174	J		14.3	"	10	"	"	Apr-02-14
Indeno(1,2,3-cd)pyrene	524			14.3	"	"	"	"	"
Dibenz(a,h)anthracene	692			143	"	100	"	"	Apr-02-14



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**Semivolatiles by GC/MS, EPA 8270D (modified)**

**US EPA Region 5 Chicago Regional Laboratory**

N-5 (1403002-05) Soil Sampled: Mar-04-14 12:50 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Benzo(g,h,i)perylene	1670			143	ug/kg dry	100	B404035	Mar-12-14	Apr-02-14
	Result			%REC		%REC Limits	Batch	Prepared	Analyzed
Surrogate: Nitrobenzene-d5	11.7			65.9%		50-94.9	"	"	Apr-02-14
Surrogate: 2-Fluorobiphenyl	16.6			93.0%		48.1-108	"	"	"
Surrogate: Terphenyl-d14	18.0			101%		59.4-127	"	"	"

N-6 (1403002-06) Soil Sampled: Mar-04-14 13:20 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	611			79.6	ug/kg dry	10	B404035	Mar-12-14	Apr-02-14
2-Methylnaphthalene	1590			796	"	100	"	"	Apr-02-14
1-Methylnaphthalene	632			79.6	"	10	"	"	Apr-02-14
Acenaphthylene	U			16.2	"	"	"	"	"
Acenaphthene	U			79.6	"	"	"	"	"
Fluorene	157			79.6	"	"	"	"	"
Phenanthrene	1060			796	"	100	"	"	Apr-02-14
Anthracene	737			16.2	"	10	"	"	Apr-02-14
Fluoranthene	325			79.6	"	"	"	"	"
Pyrene	1230			796	"	100	"	"	Apr-02-14
Benzo (a) anthracene	1570			162	"	"	"	"	"
Chrysene	1590			162	"	"	"	"	"
Benzo(b)fluoranthene	744			16.2	"	10	"	"	Apr-02-14
Benzo(k)fluoranthene	166			16.2	"	"	"	"	"
Benzo (e) pyrene	1390			162	"	100	"	"	Apr-02-14
Benzo(a)pyrene	1820			162	"	"	"	"	"
Perylene	168	J		16.2	"	10	"	"	Apr-02-14
Indeno(1,2,3-cd)pyrene	402			16.2	"	"	"	"	"
Dibenz(a,h)anthracene	523			16.2	"	"	"	"	"
Benzo(g,h,i)perylene	1110			162	"	100	"	"	Apr-02-14
	Result			%REC		%REC Limits	Batch	Prepared	Analyzed



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## Semivolatiles by GC/MS, EPA 8270D (modified)

### US EPA Region 5 Chicago Regional Laboratory

N-6 (1403002-06) Soil Sampled: Mar-04-14 13:20 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Surrogate: Nitrobenzene-d5	8.91			44.3%		50-94.9	B404035	Mar-12-14	Apr-02-14
Surrogate: 2-Fluorobiphenyl	18.4			91.4%		48.1-108	"	"	"
Surrogate: Terphenyl-d14	19.0			94.6%		59.4-127	"	"	"

N-2 Duplicate (1403002-07) Soil Sampled: Mar-04-14 09:10 Received: Mar-04-14 15:15

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Naphthalene	770			79.2	ug/kg dry	10	B404035	Mar-12-14	Apr-02-14
2-Methylnaphthalene	1930			792	"	100	"	"	Apr-02-14
1-Methylnaphthalene	968			792	"	"	"	"	"
Acenaphthylene	21.5			16.1	"	10	"	"	Apr-02-14
Acenaphthene	108			79.2	"	"	"	"	"
Fluorene	249			79.2	"	"	"	"	"
Phenanthrene	1520			792	"	100	"	"	Apr-02-14
Anthracene	889			161	"	"	"	"	"
Fluoranthene	433			79.2	"	10	"	"	Apr-02-14
Pyrene	2330			792	"	100	"	"	Apr-02-14
Benzo (a) anthracene	3480			161	"	"	"	"	"
Chrysene	4450			161	"	"	"	"	"
Benzo(b)fluoranthene	1900			161	"	"	"	"	"
Benzo(k)fluoranthene	415			16.1	"	10	"	"	Apr-02-14
Benzo (e) pyrene	4180			161	"	100	"	"	Apr-02-14
Benzo(a)pyrene	4420			161	"	"	"	"	"
Perylene	281	J		16.1	"	10	"	"	Apr-02-14
Indeno(1,2,3-cd)pyrene	1160			161	"	100	"	"	Apr-02-14
Dibenz(a,h)anthracene	1570			161	"	"	"	"	"
Benzo(g,h,i)perylene	3210			161	"	"	"	"	"

	Result	%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Nitrobenzene-d5	23.0	115%	50-94.9	"	"	Apr-02-14
Surrogate: 2-Fluorobiphenyl	18.8	93.9%	48.1-108	"	"	"
Surrogate: Terphenyl-d14	16.1	80.5%	59.4-127	"	"	"



Environmental Protection Agency Region 5  
**Chicago Regional Laboratory**

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Air Division, US EPA Region 5  
77 West Jackson Boulevard  
Chicago IL, 60605

Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

Reported:  
Apr-11-14 10:21

**Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B404035 - Solvent Extraction**

Blank (B404035-BLK1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Naphthalene	U			3.31	ug/kg					
2-Methylnaphthalene	U			3.31	"					
1-Methylnaphthalene	U			3.31	"					
Acenaphthylene	U			0.67	"					
Acenaphthene	U			3.31	"					
Fluorene	U			3.31	"					
Phenanthrene	U			3.31	"					
Anthracene	U			0.67	"					
Fluoranthene	U			3.31	"					
Pyrene	U			3.31	"					
Benzo (a) anthracene	U			0.67	"					
Chrysene	U			0.67	"					
Benzo(b)fluoranthene	U			0.67	"					
Benzo(k)fluoranthene	U			0.67	"					
Benzo (e) pyrene	U			0.67	"					
Benzo(a)pyrene	U			0.67	"					
Perylene	U			0.67	"					
Indeno(1,2,3-cd)pyrene	U			0.67	"					
Dibenz(a,h)anthracene	U			0.67	"					
Benzo(g,h,i)perylene	U			0.67	"					

	Result	Units	Spike Level	%REC Limits	RPD
Surrogate: Nitrobenzene-d5	6.43	"	8.353	77.0%	50-94.9
Surrogate: 2-Fluorobiphenyl	6.84	"	8.353	81.9%	48.1-108
Surrogate: Terphenyl-d14	8.11	"	8.353	97.1%	59.4-127

Blank (B404035-BLK2)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
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Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

Reported:  
Apr-11-14 10:21

**Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B404035 - Solvent Extraction**

Blank (B404035-BLK2)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Naphthalene	U			3.27	ug/kg					
2-Methylnaphthalene	U			3.27	"					
1-Methylnaphthalene	U			3.27	"					
Acenaphthylene	U			0.66	"					
Acenaphthene	U			3.27	"					
Fluorene	U			3.27	"					
Phenanthrene	U			3.27	"					
Anthracene	U			0.66	"					
Fluoranthene	U			3.27	"					
Pyrene	U			3.27	"					
Benzo (a) anthracene	U			0.66	"					
Chrysene	U			0.66	"					
Benzo(b)fluoranthene	U			0.66	"					
Benzo(k)fluoranthene	U			0.66	"					
Benzo (e) pyrene	U			0.66	"					
Benzo(a)pyrene	U			0.66	"					
Perylene	U			0.66	"					
Indeno(1,2,3-cd)pyrene	U			0.66	"					
Dibenz(a,h)anthracene	U			0.66	"					
Benzo(g,h,i)perylene	U			0.66	"					

	Result	Units	Spike Level	%REC Limits
Surrogate: Nitrobenzene-d5	6.22	"	8.256	75.3% 50-94.9
Surrogate: 2-Fluorobiphenyl	7.00	"	8.256	84.8% 48.1-108
Surrogate: Terphenyl-d14	7.96	"	8.256	96.4% 59.4-127

LCS (B404035-BS1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
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Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

Reported:  
Apr-11-14 10:21

**Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B404035 - Solvent Extraction**

LCS (B404035-BS1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Naphthalene	7.25			3.23	ug/kg	8.151		89.0%	43.1-108	
2-Methylnaphthalene	7.59			3.23	"	8.151		93.1%	45.5-117	
1-Methylnaphthalene	6.48			3.23	"	8.151		79.5%	45.5-117	
Acenaphthylene	7.08			0.66	"	8.151		86.9%	52.7-117	
Acenaphthene	7.06			3.23	"	8.151		86.6%	51.7-116	
Fluorene	7.66			3.23	"	8.151		94.0%	57.9-120	
Phenanthrene	8.11			3.23	"	8.151		99.6%	68.1-114	
Anthracene	7.51			0.66	"	8.151		92.1%	69.7-116	
Fluoranthene	8.12			3.23	"	8.151		99.7%	70.8-122	
Pyrene	8.10			3.23	"	8.151		99.4%	71.8-117	
Benzo (a) anthracene	7.77			0.66	"	8.151		95.3%	67.6-115	
Chrysene	7.31			0.66	"	8.151		89.7%	68.5-117	
Benzo(b)fluoranthene	7.85			0.66	"	8.151		96.4%	68.9-128	
Benzo(k)fluoranthene	7.70			0.66	"	8.151		94.5%	62.8-135	
Benzo (e) pyrene	7.59			0.66	"	8.151		93.1%	68.9-133	
Benzo(a)pyrene	7.11			0.66	"	8.151		87.2%	68.9-133	
Perylene	6.86			0.66	"	8.151		84.1%	68.9-133	
Indeno(1,2,3-cd)pyrene	7.66			0.66	"	8.151		94.0%	70-129	
Dibenz(a,h)anthracene	7.58			0.66	"	8.151		93.0%	69.1-131	
Benzo(g,h,i)perylene	7.39			0.66	"	8.151		90.7%	53.9-139	

	Result	Units	Spike Level	%REC Limits
Surrogate: Nitrobenzene-d5	6.31	"	8.151	77.4% 50-94.9
Surrogate: 2-Fluorobiphenyl	6.78	"	8.151	83.2% 48.1-108
Surrogate: Terphenyl-d14	8.00	"	8.151	98.2% 59.4-127

LCS Dup (B404035-BS1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
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Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

Reported:  
Apr-11-14 10:21

**Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control**  
**US EPA Region 5 Chicago Regional Laboratory**

**Batch B404035 - Solvent Extraction**

LCS Dup (B404035-BSD1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Naphthalene	5.68			3.35	ug/kg	8.455	67.1%	43.1-108	24.4	30.2
2-Methylnaphthalene	6.07			3.35	"	8.455	71.8%	45.5-117	22.2	36.4
1-Methylnaphthalene	5.93			3.35	"	8.455	70.1%	45.5-117	8.80	36.4
Acenaphthylene	6.26			0.68	"	8.455	74.0%	52.7-117	12.4	30
Acenaphthene	6.26			3.35	"	8.455	74.1%	51.7-116	12.0	30
Fluorene	6.99			3.35	"	8.455	82.7%	57.9-120	9.21	30
Phenanthrene	7.39			3.35	"	8.455	87.4%	68.1-114	9.39	30
Anthracene	7.01			0.68	"	8.455	82.9%	69.7-116	6.93	30
Fluoranthene	7.91			3.35	"	8.455	93.5%	70.8-122	2.70	30
Pyrene	7.95			3.35	"	8.455	94.0%	71.8-117	1.91	30
Benzo (a) anthracene	8.03			0.68	"	8.455	95.0%	67.6-115	3.29	30
Chrysene	7.42			0.68	"	8.455	87.8%	68.5-117	1.53	30
Benzo(b)fluoranthene	8.10			0.68	"	8.455	95.8%	68.9-128	3.08	30
Benzo(k)fluoranthene	7.41			0.68	"	8.455	87.7%	62.8-135	3.81	30
Benzo (e) pyrene	7.61			0.68	"	8.455	90.0%	68.9-133	0.263	30
Benzo(a)pyrene	7.51			0.68	"	8.455	88.8%	68.9-133	5.47	30
Perylene	7.07			0.68	"	8.455	83.6%	68.9-133	3.09	30
Indeno(1,2,3-cd)pyrene	7.77			0.68	"	8.455	91.9%	70-129	1.46	30
Dibenz(a,h)anthracene	7.64			0.68	"	8.455	90.4%	69.1-131	0.752	30
Benzo(g,h,i)perylene	7.46			0.68	"	8.455	88.3%	53.9-139	0.997	30

	Result	Units	Spike Level	%REC Limits
Surrogate: Nitrobenzene-d5	5.41	"	8.455	64.0% 50-94.9
Surrogate: 2-Fluorobiphenyl	6.32	"	8.455	74.7% 48.1-108
Surrogate: Terphenyl-d14	7.96	"	8.455	94.1% 59.4-127

MRL Check (B404035-MRL1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
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Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

Reported:  
Apr-11-14 10:21

## Semivolatiles by GC/MS, EPA 8270D (modified) - Quality Control US EPA Region 5 Chicago Regional Laboratory

### Batch B404035 - Solvent Extraction

MRL Check (B404035-MRL1)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Acenaphthylene	0.51	K		0.67	ug/kg	0.6705		76.0%	52.7-117	
Anthracene	0.58	K		0.67	"	0.6705		86.0%	69.7-116	
Benzo (a) anthracene	0.66	K		0.67	"	0.6705		98.9%	67.6-115	
Chrysene	0.71	K		0.67	"	0.6705		106%	68.5-117	
Benzo(b)fluoranthene	0.67			0.67	"	0.6705		99.2%	68.9-128	
Benzo(k)fluoranthene	0.64			0.67	"	0.6705		94.8%	62.8-135	
Benzo (e) pyrene	0.63			0.67	"	0.6705		94.4%	68.9-133	
Benzo(a)pyrene	0.58			0.67	"	0.6705		86.5%	68.9-133	
Perylene	0.60			0.67	"	0.6705		89.1%	68.9-133	
Indeno(1,2,3-cd)pyrene	0.62			0.67	"	0.6705		93.0%	70-129	
Dibenz(a,h)anthracene	0.62			0.67	"	0.6705		92.2%	69.1-131	
Benzo(g,h,i)perylene	0.64			0.67	"	0.6705		95.9%	53.9-139	

	Result	Units	Spike Level	%REC	%REC Limits
Surrogate: Nitrobenzene-d5	5.64	"	8.381	67.3%	50-94.9
Surrogate: 2-Fluorobiphenyl	6.49	"	8.381	77.4%	48.1-108
Surrogate: Terphenyl-d14	7.87	"	8.381	93.9%	59.4-127

MRL Check (B404035-MRL2)

Prepared: Mar-12-14 Analyzed: Mar-28-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Naphthalene	2.17			3.23	ug/kg	3.259		66.5%	43.1-108	
2-Methylnaphthalene	2.27			3.23	"	3.259		69.8%	45.5-117	
1-Methylnaphthalene	2.18			3.23	"	3.259		66.8%	45.5-117	
Acenaphthene	2.29			3.23	"	3.259		70.4%	51.7-116	
Fluorene	2.64			3.23	"	3.259		80.9%	57.9-120	
Phenanthrene	3.17	K		3.23	"	3.259		97.3%	68.1-114	
Fluoranthene	3.29			3.23	"	3.259		101%	70.8-122	
Pyrene	3.32			3.23	"	3.259		102%	71.8-117	





Environmental Protection Agency Region 5  
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Project: SE Chicago Petcoke  
Project Number: [none]  
Project Manager: Motria Caudill

**Reported:**  
Apr-11-14 10:21

**Notes and Definitions**

- K The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
- J The identification of the analyte is acceptable; the reported value is an estimate.
- U Not Detected
- NR Not Reported

## Items for Project Manager Review

LabNumber	Analysis	Analyte	Exception
			This is a modified report VERSION 6.12:2007
1403002-01	SVOA PAHs in solids by press. fl	Nitrobenzene-d5	Exceeds lower control limit
1403002-02	SVOA PAHs in solids by press. fl	Nitrobenzene-d5	Exceeds upper control limit
1403002-03	SVOA PAHs in solids by press. fl		Missing 2-Fluorobiphenyl
1403002-03	SVOA PAHs in solids by press. fl		Missing Nitrobenzene-d5
1403002-03	SVOA PAHs in solids by press. fl		Missing Terphenyl-d14
1403002-04	SVOA PAHs in solids by press. fl	Nitrobenzene-d5	Exceeds upper control limit
1403002-06	SVOA PAHs in solids by press. fl	Nitrobenzene-d5	Exceeds lower control limit
1403002-07	SVOA PAHs in solids by press. fl	Nitrobenzene-d5	Exceeds upper control limit
B404035-MRL1	SVOA PAHs in solids by press. fl	Acenaphthylene	K: The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
B404035-MRL1	SVOA PAHs in solids by press. fl	Anthracene	K: The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
B404035-MRL1	SVOA PAHs in solids by press. fl	Benzo (a) anthracene	K: The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
B404035-MRL1	SVOA PAHs in solids by press. fl	Chrysene	K: The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
B404035-MRL2	SVOA PAHs in solids by press. fl	Phenanthrene	K: The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.

**Sample, Log and Extraction Comments**